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## **Kitchen Hood Exhaust Power Clean™ Air Pollution Control System**

### Introduction

There is a diverse range of air filtration products used to clean general and specific contaminants from the air we breathe. One of these products is the Power Clean Electrostatic Precipitator. Unlike most disposable filter products, Power Clean is not a fiber bed type filter which strains particles from the air, rather it uses an electric current to statically charge particles, which are then attracted to and held by, a series of parallel aluminum plates. There are several key reasons we choose Power Clean technology to solve kitchen exhaust emissions problems.

### Removing Smoke and Grease Particles

Cooking food produces a complex mixture of mostly sub-micron particles, which are by nature sticky/tacky and are generated in relatively large quantities. Under these conditions, fiber bed filters have a premature life because the tacky particles quickly coat the media surface, blinding the filter. Blinding, in turn causes an increase in resistance, which in turn restricts the amount of air needed for proper exhaust. It is not uncommon for blinding to result in daily filter change out in order to keep an exhaust system operational.

Filtering kitchen exhaust air to a high level of efficiency is best achieved with an industrial grade electrostatic precipitator (ESP), but only one that is built for continuous, reliable service. Power Clean was developed in 2000, by the Air Scrubbers team; a team with 2 decades of electrostatic design, manufacturing and applications experience; a team challenged and committed to develop "the next generation of ESP's".

Controlling particulate emissions from kitchen exhaust air, Power Clean offers the following features and benefits. Refer to Power Clean brochure No. PB-1803-1099.

- Permanent collector elements, no replacement filter cost or disposal
- Low and constant resistance to airflow, reduces blower HP and maintains air volume
- High collection efficiency, nearly indiscriminant against particle size
- Requires low power for ESP operation, about 30 W / 1,000 cfm
- Built-in water / detergent cleaning, preprogrammed to wash automatically
- Highest quality electronic and mechanical components available

### Removing Odors

Where cooking exhaust odors are an issue, Air Scrubbers extends the Power Clean ESP system to include a high performance odor control media. This is a highly activated, virgin carbon, impregnated with select ingredients to enhance adsorption of odor molecules from cooking operations. The carbon granules are permanently bonded together to form a rigid, self supporting carbon panel. This ensures 100% carbon density (no voids, no untreated bypass air) and the panels are disposable.

### Configuration

Power Cleans' ESP particulate collector and odor control sections are both built up using matching modular components. So, the height versus width of a system can be configured to more closely match the available space. A number of other components can be included into the system such as inlet transitions or plenums, custom mounting bases and a full range of blower/motors available to meet any set of design conditions. Air Scrubbers can provide a complete multi-section system in a one piece, set-in-place housing or in individual sections as required.

### Construction

Whether shipped as one piece or in individual sections, Power Clean housings are manufactured using 14 gage steel, continuous welded, primed and powder coated inside and out, mounted on a steel channel perimeter base. Side access doors are provided with lift off/hinges, are fully gasketed and insulated and have knurled knob threaded closure devices. Since the Power Clean ESP features in-place water/detergent cleaning, its housing is furnished with fully welded drain pan, sloped to a convenient 3" NPT drain connection. Weatherproof construction is available for outdoor installations.

### Utility Requirements

Power Clean ESP's use a potable, hot water supply for in-place cleaning. The drain is normally piped through a grease trap, to sanitary sewer. The blower motor operates on a 3-phase electrical supply and the remainder of the system operates on one 1-phase supply.

### Sizing

Unless otherwise specified, Power Clean systems are sized at an operating velocity of 350 fpm. This produces 95% particle removal efficiency, according to MIL-STD-282 (0.3 µm DOP) Test Method. This allows a generous 0.2 second residence time in the odor control section.

### Scope of Supply

As standard, the Power Clean unit is furnished with the following field mounted accessories.

- System PLC Control, preprogrammed to automatically turn the system on and off and sequence it through a daily wash cycle
- Power Pack and high voltage cable to supply the proper electrical voltage to the ESP
- Detergent Dispenser to meter the proper detergent during a wash cycle
- Initial supply of Detergent Concentrate
- Water supply line components: solenoid valve, vacuum breaker, strainer, ball valve, gage

### Operation and Maintenance

Normally, Power Clean is programmed to start the system exhaust blower and turn the ESP on at the specified start time each day. At the specified stop time, at the end of the day, it is programmed to stop the system exhaust blower, turn the ESP off and sequence the ESP through a wash, rinse and dry cycle. Power Clean is then ready for the next day's operation. Maintenance steps are: keeping an adequate supply of detergent; servicing/replacing the odor control media; and visually inspecting ESP collectors every 3 months. ESP collectors, safety filters and odor control media should be removed and the housing interior and ESP collectors manually cleaned every 6 to 12 months.